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M2Or4C-06: Additive Manufacturing of High Purity Niobium and Copper for SRF and NCRF Applications

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Fabricating high purity components utilizing additive manufacturing can be difficult due to contamination (oxygen) of the powder feedstock during handling/screening before the process. Contamination could also occur during fabrication due to the processing environment. Special considerations have to be taken when dealing with high purity materials such as niobium or copper. Here we present work on producing high purity niobium and pure copper utilizing electron beam melting (EBM) for SRF and NCRF applications. Machine modifications to the EBM were made to ensure minimal contamination pickup during fabrication. Detailed analysis of the chemical changes of the powder feedstock through the entire additive process along with physical properties such as microstructure, RRR, and superconducting transition temperature will be discussed.

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